2.0 DESCRIPTION OF THE PROPOSED PROJECT

2.1 INTRODUCTION

This Draft EIR examines the environmental impacts associated with operation of the Equilon Enterprises LLC, dba Shell Marine Oil Terminal under the proposed new thirty (30) year lease. Since the Shell Terminal is currently operating, this Draft EIR examines the effects of the existing Shell Terminal operations over the proposed 30-year lease period. Section 2.2, Project Background, presents an overview of the existing Shell Terminal structure, and Section 2.3, Proposed Project, describes the proposed Project (continued Shell Terminal operations). Alternatives considered in this Draft EIR are presented in Section 3.1, Factors Used in Selection of Alternatives, and the cumulative projects considered for the analysis are presented in Section 3.4, Cumulative Projects.

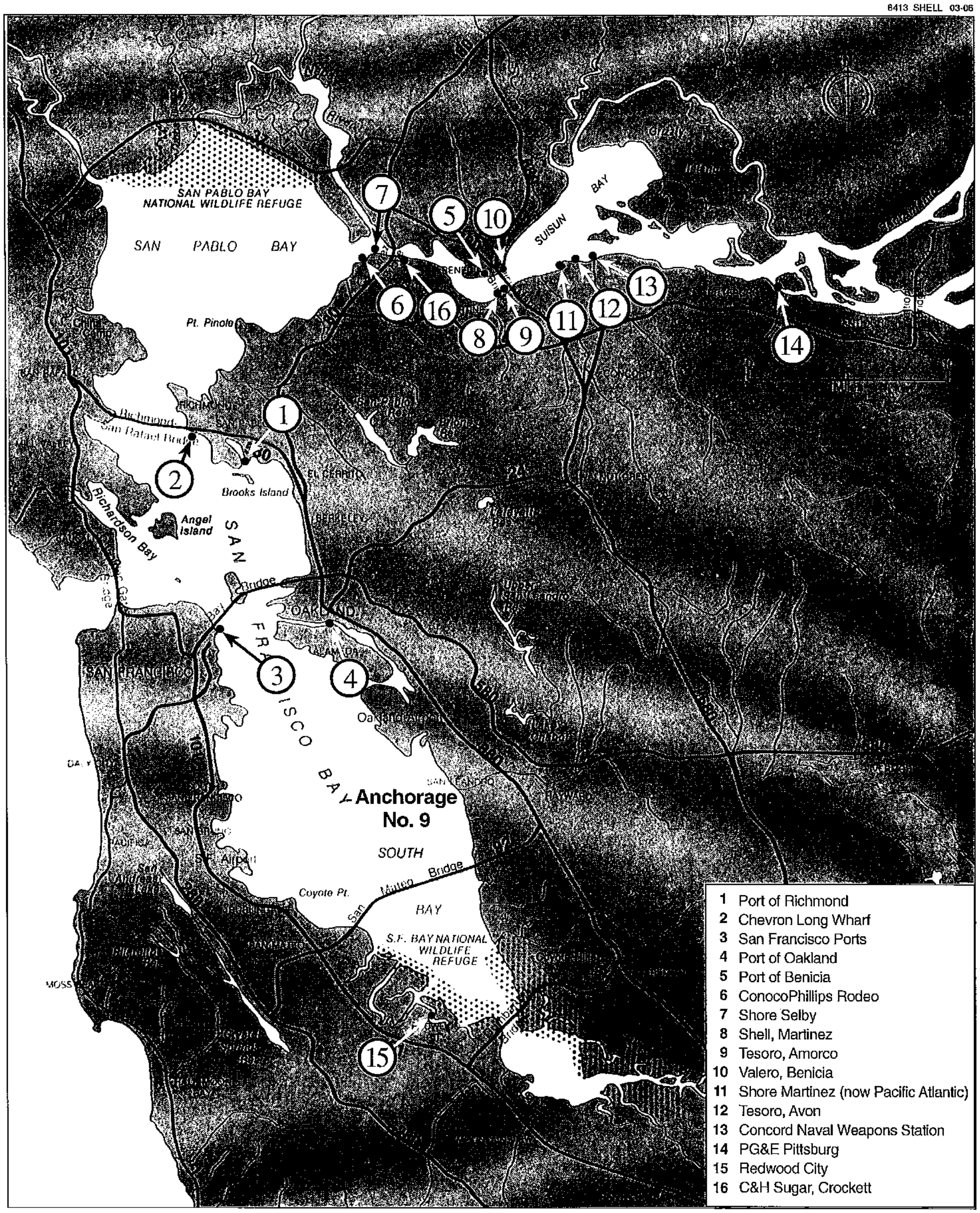
2.1.1 Regional Setting

Five of California's largest refineries are located within Carquinez Strait and San Pablo Bay. In addition to the Shell Refinery at Martinez, these include Tesoro at Avon, Tesoro at Martinez, Valero at Benicia, ConocoPhillips at Rodeo, and Chevron at Richmond. These refineries generally run a combination of foreign, Alaskan North Slope (ANS) and some San Joaquin Valley (SJV) crudes. The locations of these refineries are shown in Figure 2.1-1.

All of these refineries have marine terminals. In addition to receipt of oils via the marine terminals, transport also occurs via pipelines. At present, Shell, Tesoro, Valero, and ConocoPhillips have pipeline connections to the Pacific Atlantic marine terminal in Martinez which is an upland storage facility with no refinery. Other pipelines in the area include the Texaco pipeline from the SJV, a heated, proprietary system that supplies San Joaquin Valley Heavy (SJVH) crude to ConocoPhillips, Valero, and Shell. ConocoPhillips facility in Santa Maria processes local heavy crude, including some from the outer continental shelf (OCS) and SJVH and transports the product stream to ConocoPhillips Rodeo for further refining through ConocoPhillips Oleum Pipeline. Chevron Pipeline Company also operates a common carrier line importing SJV crude to the Bay Area. ConocoPhillips, Shell, and Chevron-Richmond all have connections to this pipeline.

In addition to the above refineries, there are eight ports, 26 marine terminals, and one naval terminal in the Bay, at the Concord Naval Weapons Depot.

Figure 2.1-1 – Location of Major Bay Area Terminals



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Source: California Coastal Resource Guide
California Coastal Commission, 1987

LOCATION OF MAJOR BAY AREA TERMINALS
Figure 2.1-1

A breakdown of vessel calls in terms of passenger and cargo vessels, tanker traffic, tow or tug, and barges is provided in Section 3.4.3, Regional Characteristics of Crude/Product Transportation in Bay and Along Coastal Shipping Lanes off Northern California, with numbers based on *Waterborne Commerce of the United States, Calendar Year 2003, Part 4 – Waterways and Harbors of the Pacific Coast, Alaska and Hawaii* (USACE 2003). For discussion purposes, the marine terminals have been grouped as follows:

- Carquinez Strait and farther inland;
- Port of Richmond Area;
- Port of San Francisco;
- Port of Oakland; and,
- Port of Redwood City.

Carquinez Strait and Farther Inland

A number of terminals lie inland (east) of the Carquinez Bridge. They include the C & H Sugar Company/ Crockett, Shell/ Martinez, Pacific Atlantic (formerly Shore)/ Martinez, Tesoro-Avon/ Martinez, Port of Benecia and Valero/ Benecia, Concord Naval Weapons Station, and PG&E/ Pittsburg. Other ports and terminals are located in Suisun Bay, Sacramento, and Stockton. In 2003, there were 6,001 vessel trips through the Carquinez Strait, involving 819 tankers (USACE 2003).

Port of Richmond Area

Facilities in the Richmond Harbor are located in three areas: at the Richmond Inner Channel, on Harbor Channel, and on Santa Fe Channel. The Port of Richmond provides seven City-owned terminals on a 35-foot deep shipping channel. These facilities handle commodities such as petroleum products, chemicals, petrochemicals, vegetable oils, molasses, vehicles, steel and wood articles, and containerized articles. Two concrete finger piers are available for vessel lay-ups, with five dry docks for lay-ups. At Point Richmond, just south of the Richmond-San Rafael Bridge, but north of the Port of Richmond, is the Chevron Long Wharf and Refinery.

The Port of Richmond also includes 11 privately owned terminals. The facilities handle bulk liquid products, scrap metal, various dry-bulk, and break-bulk commodities.

Five major facilities operate on Santa Fe Channel. The Shore, Richmond Company Wharf is used for receipt and shipment of petroleum products. The Levin-Richmond Terminal Berths A, B, and C are used for receipt and shipment of dry bulk cargo, chemicals, and steel. The IMTT (former Texaco) Wharf is used for receipt and shipment of petroleum products, as is the Burmah-Castrol Wharf. The National Gypsum Company dock is used for receipt of gypsum rock.

In 2003, there were 11,571 vessel trips through the Richmond Harbor, including 758 tankers San Francisco Harbor /Port of San Francisco

Port of San Francisco

The Port of San Francisco is the nation's fifth largest port in the U.S. in terms of vessel calls with 3,623 in 2003, slightly less than the 3,639 in 2002 (U.S. Department of Transportation, Vessel Calls at U.S. Ports, 2003). The port's marine facilities include cargo handling for containers, roll-on roll-off goods, and break-bulk commodities. The port operates eight shoreside container cranes in 40-foot water and provides full on-dock rail service. From 1988 to 1998, container vessel calls in/out of the Port of San Francisco averaged about 600 per year (Long-Term Management Strategy [LTMS] 1998). In 2003, total inbound vessel trips for the entire San Francisco Harbor area totaled 35,016 vessels, 16 of which were tankers (USACE 2003). The majority of the vessels trips (34,230) were passenger traffic and vessels carrying dry cargo (USACE 2003).

Port of Oakland/Oakland Area

The Port of Oakland, the fourth largest seaport in the nation, was established in 1927. There are no marine oil terminals in the Port of Oakland. The Port of Oakland occupies 19 miles of waterfront on the eastern shore of San Francisco Bay, with 665 acres devoted to maritime activities and another 3,000 acres devoted to aviation activities. Since 1962, the Port has spent more than $1.4 billion to construct 1,210 acres of marine terminals, intermodal rail facility, and maritime support area. This includes over $700 million for the current Vision 2000 program, which includes development of two new maritime terminals, a new intermodal rail facility, deepening channels and berths from -42' to -50', and a new public park and wildlife habitat. Most of the landside projects have been completed or are nearing completion while the dredging program, which started in October of 2001, will take approximately five to six years to complete. Oakland's 20 deepwater berths and 35 container cranes are supported by a network of local roads and interstate freeways, warehouses and intermodal rail yards. The Oakland area also supports numerous other terminal facilities not strictly within the Port of Oakland, but considered a part of the Oakland area. These include additional container terminals and a variety of large and small recreational craft harbors. In 2003, inbound and outbound vessel trips for the entire Oakland Harbor area totaled 22,884 vessels, 4 of which were tankers (USACE 2003). The majority of the vessels trips were passenger traffic and vessels carrying dry cargo (USACE 2003).

The former Oakland Army Base (OARB), consisting of 368 acres, is also located in the Oakland Harbor area, and was approved by the Department of the Army for closure in 1995. In July 2002, the Oakland Base Reuse Authority (OBRA) adopted a Final Reuse Plan for the OARB. Property acquired by the Port from the Army is being used to construct and operate new Outer Harbor mega-terminals (Port of Oakland Website, http://www.portofoakland.com/maritime/factsfig.asp September 2005).

Port of Redwood City

The Port of Redwood City handles primarily cement, lumber, scrap metal, and dry bulk commodities for firms located near the port. The port is also a USCG certified oil waste reception facility. Facilities include five wharves. Total inbound and outbound vessel trips counted were approximately 279 in 2003 (USACE 2003).

2.2 PROJECT BACKGROUND

2.2.1 Shell Terminal History

The Shell Terminal and Refinery have operated at the current location, transferring and processing hydrocarbon fuels, lubricating oils and asphalt, since 1915. The Shell Terminal operates on approximately 28 acres of sovereign land leased from the CSLC as a barge and tanker transfer facility for crude oil and petroleum products. The Shell Terminal is capable of operating annually for 365 days, 24 hours a day, although actual operating time depends on shipping demands. Shell's Refinery lies on 850 acres of Shell-owned (upland) property immediately south of the Shell Terminal.

2.2.2 CSLC Lease Boundary and Regulatory Boundary Areas

Shell's Martinez Refinery and Marine Terminal facilities are shown in Figure 2.2-1. The Shell Terminal, delineated within the yellow outline (an expanded in Figure 2.3-1), consists of approximately 28 acres of public land leased from the CSLC as a barge and tanker transfer facility for crude oil and petroleum products. Immediately south and east of the Shell Terminal, is the 850-acre Shell-owned (upland) Refinery.

2.3 PROPOSED PROJECT

2.3.1 Project Action

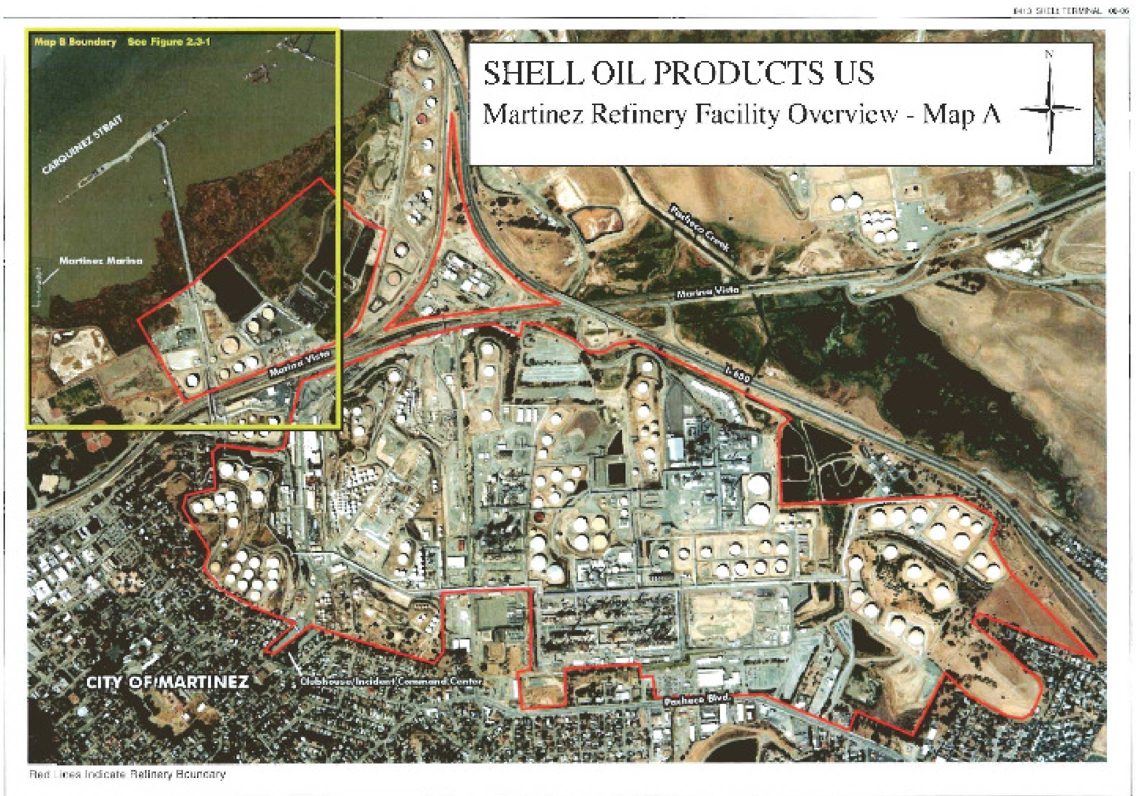
Shell has applied to the CSLC for a new 30-year lease. The new lease, if granted by the CSLC, would allow Shell to continue existing operations 30 years after the date of the lease signing. This Draft EIR examines the environmental impacts associated with operation of the Shell Terminal under the proposed new lease.

2.3.2 Physical Description of the Shell Terminal

Shell Terminal Configuration and Berthing Capacities

The Shell Terminal is located on the south shore of the Carquinez Strait approximately one-half mile west of the Benicia-Martinez Bridge (I-680).

Figure 2.2-1 – Shell Facility Overview



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Source: Shell Oil Products US, Oil Spill Response Plan

SHELL FACILITY OVERVIEW
Figure 2.2-1

The T-shaped Shell Terminal consists of a 1,950-foot long, average 40-foot wide, concrete wharf connected to shore by a 1,900-foot long, 16-foot wide, elevated wooden approach trestle. A 40-foot-wide pile-supported pipe rack parallels the trestle. The Shell Terminal is shown in Figure 2.3-1.

The Shell Terminal docking facility has four berths – two berths (#1 and #2) on the outer (north) side, and two berths (#3 and #4) on the inner (south) side – equipped with pumps, pipelines, electrical utilities and other mechanical equipment. The current displacement limitation for Berth #1 is 188,000 Long Tons (L/T) (a long ton is 2,240 pounds) and 150,000 L/T for Berth #2. A 1,000-foot tanker has been moored at Berth #1 while Berth #2 simultaneously has moored a smaller vessel. The north side of the Shell Terminal normally maintains a minimum draft of minus 38 feet Mean Lower Low Water (MLLW), and has not been historically dredged.

Berths #3 and #4 normally serve to load and unload barges, but currently are not in use, due to accumulated silt. These berths were dredged to -20 feet MLLW in 1989. Future dredging requirements during the lease period are anticipated to run at least to that depth and possibly deeper if feasible, and if moorage of larger barges and/or vessels requires it.

The Shell Terminal wharf contains with one large breasting dolphin and one mooring dolphin on the east end of the wharf, and two mooring dolphins on the west end of the wharf. The dolphins are connected to the loading dock by walkways. The outboard corners of the loading dock and the breasting dolphin each have 100-ton bollards (equipment to hold a ship's mooring lines). Each mooring dolphin has double 50-ton quick release hooks with 2,600-pount line pull capacity capstans. Fenders protect the loading dock and breasting dolphins. Oil spill containment booms are located on each end of the Shell Terminal structure.

Loading Hoses, and Pier Pipelines

There are eleven loading/unloading hoses located on the Shell Terminal. Nitrogen is used to empty the hoses before uncoupling them from the ship. Each hose has a tight-seal shut-off valve. A 12-inch marine vapor hose is used to collect and recover vapors displaced during vessel loading operations. The displaced vapors are transported through a 12-inch vapor recovery pipeline to a Marine Vapor Recovery (MVR) system located on upland Shell property. BAAQMD regulations require the use of the MVR during loading operations with gasoline and products with volatile vapors. It is not required during transfers of non-volatile products or vessel offloading.

The 1,900-foot Shell Terminal trestle supports 18 product pipelines connecting to storage tanks on the upland parcel. The Shell Terminal trestle expands over marshlands and open water on the Carquinez Strait. Shell regularly inspects all the trestle pipelines and checks them for corrosion.

Figure 2.3-1 – Shell Marine Terminal Major Components

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Source: Shell Products US Oil Spill Response Plan 2004

SHELL MARINE TERMINAL
MAJOR COMPONENTS
Figure 2.3-1

Stormwater Management, Drip and Recovered Oil Collection

All drips and discharges on the Shell Terminal drain into collection systems that engage automatically by level control switches to avoid overflows. There are two collection systems at each Berth: one collects gasoline and gasoline components, and the other collects heavier non-gasoline components. The collection systems use high and low level switches and alarms installed in the sump for each collection system. These provide for automatic start up and shut down of the sump pumps for the collection systems. Redundant instrumentation also provides additional monitoring information and protection for the systems sump pumps. The Terminal Person-In-Charge (TPIC) or his designee checks drip pans once per shift.

The Shell Terminal has berms or curbing surrounding the transfer area of each berth. These bermed areas drain into a sump system for each berth, fed from a series of collection pans under every manifold. The purpose is to capture drips, spills from transfer operations and oil drained from loading arms/pipelines during purging and maintenance activities. The sump pumps these hydrocarbon spills, including rainwater, to shore by automatic level-control switches. High-level alarms are installed in the sumps and will sound/flash when water and/or hydrocarbons reach a set point. This set point is below the maximum level at which the sump would overflow and cause spillage into the Carquinez Strait. When the alarms activate, Shell terminates all hydrocarbon transfer operations (if in progress), and does not resume until corrective action is completed. The total sump system capacity at Berth #1 and Berth #2 is about 4,400 gallons.

The Terminal also has a thin fuel blender that has a similar drip pan, sump and alarm system. The sump capacity at the thin fuel blender is 2,200 gallons. This fuel blender system has not been used in more than 15 years and is being considered for removal. Currently it is “void of liquids.”

The collection system sump pumps transfer accumulated liquids through a two-inch line to an upland oil-water separator at Shell’s Effluent Treatment Plant (ETP). At the oil-water separator, oil is pumped to a recovered oil tank for transfer back to the Refinery for processing. The ETP treats and discharges wastewater under the National Pollution Discharge Elimination System (NPDES) Permit CA00005789.

The terminal facility has USCG-approved Certificates of Adequacy (COAs) for Oil, Garbage and Noxious Substances. These COAs were issued in 2004 and will be renewed in 2009. Oily wastes from vessels that may not be legally handled by the ETP would be collected via tank trucks for removal and offsite treatment.

Spill controls are further addressed in the Oil Spill Contingency Plan for the facility and are summarized below in Section 2.3.7, Oil Spill Response Capability.

Ballast Water Discharge Controls

Shell's Marine Oil Terminal Operations Manual specifies requirements regarding the handling of wastes, if any, from cargo ships and barges using the Shell Terminal. These requirements are based upon:

- USCG regulations regarding the availability and adequacy of ballast water handling facilities at marine terminals. These regulations serve the basis for issuing COAs to marine terminals. These documents qualify a facility's adequacy;
- U.S. Environmental Protection Agency (EPA) regulations regarding the storage, treatment and disposal of hazardous and non hazardous wastes; and,
- Shell Corporate and Martinez Refinery policies and procedures regarding ETP operations.

The Terminal Operations Manual also describes available ship ballast and waste handling facilities at the ETP and how they should be used. Ships are required by USCG regulations to provide 24 hours notice to a marine terminal regarding potential needs for deballasting. This notice, including a description of the material to be discharged from the vessel, is provided to the Shell ETP. Wastes may not be received from ships not complying with this requirement. Shell requires the sampling of received ballast. As required by Shell Terminal procedures, during a ship-to-ETP ballast transfer, the TPIC must take two samples: one at the start of the transfer and one at the finish. The Effluent Treating Operator is responsible for taking custody of the samples for retention and completing required documentation. To date, no waste has ever been transferred from a ship to the terminal.

A ship carrying little or no cargo rides high in the water, having less draft than a loaded ship. Ballast water intake allows a ship to ride lower in the water, thus increasing stability and making the vessel less vulnerable to waves and winds, less vulnerable to the bow being slammed when riding over high waves, and less potential for the propeller to raise out of the water. Ballast water is also loaded or discharged to:

- Adjust a ship's trim;
- Improve maneuverability;
- Increase propulsion efficiency;
- Reduce hull stress;
- Raise the ship to pass over shallow areas (reduce draft); and,
- Lower the ship to get under bridges or cranes (lower air draft).

Ballast water normally enters a ship through intakes located below the waterline. Depending on the level of the tank relative to the water surface, water may be taken in or discharged either by pumping or by gravitational flow. Ships generally carry ballast water in several different compartments on board, often in tanks dedicated to that purpose (referred to as "segregated ballast water"). Some tankers carry ballast water in their cargo holds which is referred to as "nonsegregated ballast water," since it is mixed with the contaminants or remnants of the material that was last in that cargo hold. Ships exchanging water from other areas may introduce Nonindigenous Aquatic Species (NAS) that can invade and possibly harm ecosystems.

Vessels operating in California waters are required to meet all Federal and State ballast water regulations, including the requirements summarized below.

Shell Terminal-bound vessels must comply with the California Ballast Water Management for Control of Nonindigenous Species Act of 1999 and California Public Resources Code Sections 71203-7 that specify ballast water management practices. The following ballast water management practices for ballast water carried into waters of the State from areas outside the Exclusive Economic Zone (EEZ) are allowed:

- Exchange ballast water outside the EEZ, from an area not less than 200 nautical miles (nm) from land, and in water at least 2,000 meters (m) deep (6,560 feet or 1,093 fathoms) before entering waters of the State;
- Retain the ballast water onboard the vessel;
- Use an alternative environmentally sound method of ballast water management that has been approved by the CSLC before the vessel begins the voyage, and that is at least as effective as ballast water exchange in removing or killing NAS;
- Discharge ballast water to an approved reception facility;
- Under extraordinary conditions, conduct a ballast water exchange within an area agreed to by the CSLC at the time of the request;

Vessels are also required to minimize the uptake and the release of NAS as follows:

- Avoid the discharge or uptake of ballast water in areas within or that may directly affect marine sanctuaries, marine preserves, marine parks, or coral reefs;
- Minimize or avoid uptake of ballast water in all of the following areas and circumstances:
    - Areas known to have infestations or populations of harmful organisms and pathogens;
    - Areas near a sewage outfall;

- Areas near dredging operations;
- Areas where tidal flushing is known to be poor, or times when a tidal stream is known to be more turbid;
- In darkness when bottom-dwelling organisms may rise up in the water column; and,
- Where propellers may stir up the sediment.

Vapor Recovery System

A MVR system captures hydrocarbon emissions from ships loading at the terminal. The collected vapor is burned in the terminal's thermal oxidizer located upland. Crude oil or gasoline (diesel vapors are not significant and are not regulated) pumped from the terminal to a ship displaces the vapor in the ship's cargo compartment. Twelve-inch vapor hoses (one each at Berth #1 and #2) collect vapors from the ship's cargo compartments.

The MVR system, installed in 1991, complies with USCG regulations 33 Code of Federal Regulations (CFR) 154 for MVR operations and with BAAQMD Regulation 8, Rule 44 (Organic Compounds, Marine Vessel Loading Terminals) that limits hydrocarbon emissions to the atmosphere from marine vessels. In the absence of vapor controls, hydrocarbon vapors escape from the cargo compartment when they are displaced during liquid product loading.

The MVR control panels are located on the MVR compressor decks and provide monitoring and control of the MVR system. The panel indicators include startup/shutdown, status of pilot lights for the marine vapor control and nitrogen purge systems, automatic shutdown with audible and visual alarms for high and low vapor pressures, oxygen content, flame detection, ship overfill, and thermal oxidizer shutdown.

Two in-line oxygen analyzers on the 12-inch marine vapor recovery pipeline monitor oxygen concentration to ensure that the vapor composition is at least 180 percent above the Upper Explosive Limit (UEL). Whenever the composition drops below this value, the operating personnel on duty add natural gas to the hydrocarbon vapor. An alarm signals if the vapor composition drops below 170 percent of the UEL and automatically shuts down if the level drops below 150 percent of UEL. In addition, the MVR's thermal oxidizer has a low temperature shutdown system that activates when the firebox temperature drops below 1,400 degrees Fahrenheit (F).

Pressure control valves keep the pressure in the ship's storage compartment within 80 percent of the ship's pressure and vacuum relief settings. An alarm automatically activates if the compartment pressure goes outside the allowable range. The MVR shuts down and loading is stopped if the pressure exceeds 2 pounds per square inch per square in gauge (psig) or 1 pound per square inch (psi) vacuum. Vapor flow is blown from the vapor hose through the 12-inch vapor line and is controlled automatically by valves that maintain a constant flow rate. Blower discharge temperature is monitored to prevent high temperature excursions. Initial and secondary high temperature alarms are set at 175 degrees F and 200 degrees F, respectively.

Buildings

A small wharf office is located near the center of the main Shell Terminal platform. This office contains the Shell Terminal operations panel for the MVR, communications equipment including telephone and multi channel Refinery radios, first aid supplies, maintenance tools, flange gaskets, clean up materials, emergency life/toss rings, and dry chemical fire extinguishers. A small building housing electrical generators used for fire pumps and circuit breakers is located on the Shell Terminal approach roadway not far from the Terminal.

Personnel and Communications

Shell's Martinez Refinery Terminal Operations Manual (2004a) requires a minimum of two personnel to be on duty during marine transfer operations. Other staff may be on the Shell Terminal for maintenance or to assist with operations if required. The TPIC supervises all ship docking and cargo transfer operations. In addition, that person is responsible for reporting emergencies and oil spills. The other operator handles all other operating requirements in the facility as well as controlling landside tankage and piping systems in support of marine cargo transfers. In addition, Shell requires that at least one crewman be aboard every tanker vessel at all times while it is moored at the berth. This person is the designated Vessel Person-In-Charge (VPIC).

A portable radio is placed aboard the berthed vessel for continuous communication between the VPIC and the TPIC. All radios must be intrinsically safe against explosion. If radio contact cannot be made with either the VPIC or TPIC, the party attempting to activate radio communications can signal the other using a canister air horn on the vessel or the emergency horn located in the Shell Terminal's control room. If radio access is not made, the VPIC and TPIC are required to proceed to the gangway to implement voice exchange and/or hand signals until radio communication is restored. In addition, there are two telephones with direct connections to the Shell Terminal office and outside lines.

While cargo is being transferred, the TPIC is to contact the VPIC each hour and at shift changes to verify that the communication system remains functional.

Security

Shell is required to comply with Federal, State, and local regulations regarding physical security for marine terminals. Policies and procedures to assure compliance with these requirements include:

- Only authorized personnel are allowed access to the Shell Terminal, accessible only through the Shell upland property;
- Personnel entering the property must sign in with security staff and wear a Shell Facility badge;
- During the pre-transfer conference, vessels must provide crew lists to Shell Terminal operations personnel that are then distributed to the main office;
- A vessel's personnel are cleared into the upland property and then to the outside of the property using those crew lists;
- Shell Terminal operations personnel receive notification from the main security office when other people, such as vessel agents, electronics specialists, repairmen, etc., request entry to the Shell Terminal. Shell Terminal operations personnel confirm with the ship if the people requesting entry are authorized for ship access prior to allowing them entry into the Refinery and the Shell Terminal;
- Only Shell company vehicles and other vehicles pre-authorized by Shell Terminal personnel are allowed. Company vehicles are used for routine operations and maintenance activities. Pedestrians do not have access to the Shell Terminal;
- Exterior lighting is provided at the Shell Terminal to allow for nighttime operations. Lighting is provided by permanent fixtures between sunset and sunrise, and during times of reduced visibility; and,
- The Shell Terminal cannot be accessed from adjacent public areas. Physical security uses fencing control along the facility perimeter.

Storage and Transshipping Facilities (the Refinery)

The primary service area for this facility is the San Francisco Bay-Sacramento region.

The Refinery area consists of processing units for crude oil and intermediates, storage tanks piping, railroad spurs, truck loading/unloading facilities, and various and pumps and pipelines connecting these facilities. Vehicular access to the site is primarily from Marina Vista Avenue, which runs along the northern property boundary. The facility operates 24 hours per day, 365 days per year. Normally staffing levels include 850 employees and several hundred contractors.

As currently operated, the Refinery primarily receives and distributes petroleum products by land-based pipelines and marine vessels. Rail and truck transportation are also used.

Additional information on common carrier pipelines is presented in Section 3.0, Alternatives and Cumulative Projects.

2.3.3 Operational Procedures

Inspection and Testing Prior to a Ship's Arrival

The TPIC supervises all ship mooring and transfer operations, including inspection of the Shell Terminal's condition prior to a ship's arrival. Information on operating procedures is detailed in the Shell Terminal's Operations Manual (Shell 2004). The manual is reviewed annually (by Shell, the USCG and the CSLC) and updated as necessary. In addition, a Marine Terminal Guide (2004b) is sent to the vessel operators annually to provide them site-specific guidance on the Shell Terminal. This document is also reviewed annually, and updated as required with revised Guides provided to vessel operators as replacements for prior versions (Shell Wharf Operations Manual 2004).

Operations for the Shell Terminal are summarized in the following:

<u>Operation of Transfer Hoses</u>

- Shell Terminal operating personnel move hoses to tankers, large barges, or bunkering vessels with the hose crane. The hoses are connected to the vessel by vessel personnel. Fuel oil barges generally carry their own hoses, and their personnel move them to the Shell Terminal manifold where they make the connection with coordination and assistance by Shell Terminal personnel. Prior to use, all hoses (including those from barges) must be inspected by the TPIC.

Additional steps and precautions required for use of the hoses as presented in the Shell Wharf Operations Manual include:

- Each hose is marked and labeled, and a detailed list is kept in the USCG Manual in the Wharfmaster's office;

- All hoses must have the appropriate insulating flange joint or a single length of non-conducting hose to ensure electrical discontinuity between the terminal and the vessel;

- All hoses must be securely blinded and kept under a slight nitrogen pressure when not in use. The transfer hose is then moved to the ship's manifold and the nitrogen pressure is released. Although drained previously, the ship personnel still check for oil in the hoses at the bleeder valves or by cautiously loosening the blind before removing it;

- A transfer hose must never be kinked or bent to a diameter of curvature less than one foot for each inch of hose size while being used, moved or stored. Hoses are checked for kinks, chafing, and tide changes every 30 minutes during vessel loading/discharging;

- After the hoses have been connected, the supports and sumps must be checked. Typically the flowing pressure in the house is 175 psig. (The maximum allowable working pressure for Shell Terminal hoses is 275 psig). The lines in use must be entered on the Port Time Report.

- The hose support is adjusted as necessary to compensate for changes in the vessel freeboard and the tide;

- When the transfer is completed, the hose is drained to the ship or the Shell Terminal Collection System, depending on whether the ship was loaded or unloaded. Concurrently, the Collection System must be monitored during this time. The vessel valves and header manifold twin seal valves must be closed and the manifold drain valves open; and,

- Lastly, the ship's crew then disconnects the hose, installs the blind flange on the hose, and opens the bleeder valve. The hose is lifted to the hose rack and the nitrogen hose is installed to the connection on the blind flange. The ship's end of the hose is lifted high to drain the remaining contents through the manifold to the Collection System, and then lowered to the rack. The bleeder valve and nitrogen valve are then closed and the nitrogen hose disconnected. The blind flange is inspected and bolts are tightened as necessary, and the hydraulic valve and the manifold drain valve are closed.

<u>Transferring Oil</u>

- On transfers to or from tankers, the actual rates must be checked against estimated rates. If actual and normal rates do not agree, the reason must be determined and reported to the Operations Foreman; and,

- Loading fuel oil for vessels can be carried out by gravitating the fuel from the shore tank to the ship.

<u>Completion of Pumping</u>

- Upon completion of each transfer; i.e., vessel request's shutdown at completion of cargo loading the TPIC must block in/close shore side isolation valves; i.e., hydraulic and twin seal valves located at each Berth;

- Once the movement is isolated/shutdown the TPIC must log the loading completion time on his/her port time report. This will confirm that the transfer is completed; and,

- Upon completion of transfer, the TPIC will contact the vessel for loading hose disconnection. Once the loading hose is disconnected and drained to the hydrocarbon collection system it is then hung in the hose rack and loading sequence is completed.

Loading Vessel

- It is the vessel's primary responsibility not to overfill product compartments and to give the TPIC adequate notice before shutting off against the shore pumps; and

- Normally, the loading pumps are shut down before the vessels' tanks reach high gauge, and the last 10 minutes of the load is finished by gravity. If the pump is required, the loading rate is slowed as the vessel tanks approach high gauge. The TPIC must get a standby notice of at lease 15 minutes from the vessel to allow being at the pump's remote control or the product valve as required.

Discharging to Shore

- As the vessel is emptied, the transfer rate slows. Some ships switch to a small stripping system using reciprocating pumps.

Mooring Procedures

Ships are moored to allow for no drift, with the center of the ship’s manifold directly opposite the loading arms. The minimum number of mooring lines used for ships is 12 while a minimum of 6 to 8 lines may be used for barges, depending on their size. Ship crews are responsible for positioning the vessel and tensioning mooring lines and cables. High tidal currents at the Shell Terminal require that vessels be tightly breasted.

Once moored, a portable radio is provided to the ship’s VPIC and tested to assure it is in working order. The TPIC tests and verifies operation of the over-fill control panel alarm and automatic shutdown system, as needed.

A pre-transfer conference with the ship’s VPIC, is held and the Declaration of Inspection is completed and signed in accordance with 33 CFR 156.120 and 156.150 as well as CCR Article 5, Section 2335. A clear understanding of the cargo transfer orders are reviewed by the TPIC and VPIC, including quantity and product type, and transfer rates. Pumping rates to or from the Shell Terminal range from 1,000 to 20,000 barrels per hour (bph).

Hydraulically operated lifting cranes are used to move transfer hoses to the deck of vessels or barges prior to loading or unloading operations. The TPIC coordinates positioning of the vessel so that its manifold is centered directly opposite the hose. Even though the tanker vessel is moored to minimize drift, the Shell Terminal loading/unloading hoses can tolerate ten-foot drifts from the base centerline of the manifold in either direction or parallel to the Shell Terminal.

Oil/Product Transfer Procedures

Cargo from the ship is pumped by the ship, while cargo to the ship is pumped by shore side pumps. Once the TPIC confirms that piping, valves, pumps, and tankage are aligned, the transfer procedure can commence. The TPIC and VPIC agree when to start transfer via the portable radio. As required, for transfers from terminal to the ship, the marine vapor blower(s) are started, as well as the onshore thermal oxidizer unit.

Pumping begins at a low rate and the TPIC is required to observe pump discharge and marine vapor recovery line pressures. Uninterrupted radio communication is required during the entire process between the TPIC, and the VPIC. Operating pressure of the MVR is maintained and product flow and proper operation of the system is confirmed, including visually looking for piping leaks. Once proper operations are confirmed, the loading rates are gradually increased. The TPIC starts additional vapor blowers as needed to maintain correct MVR pressure, and watches for any changes in pressure that could result in leaks or improper valve or pump operation, or for conditions that could trigger an automatic MVR shutdown.

The TPIC is required to check for drips, leaks and spills at least once per hour. Additional TPIC responsibilities during transfers include:

- Checking the motor control center and circuit breakers for abnormal conditions;
- Checking Shell tank levels, and mooring conditions;
- Frequently checking on operation of the MVR unit and vapor blowers to ensure and verify proper MVR operation; and,
- Samples the product each hour or as directed and records the results.

As the transfer nears completion the loading rate is reduced. At completion, the pumps are shutdown with a remote shutdown switch, the dock valves are closed, and the MVR, if required for the transfer, is shutdown by the TPIC.

The loading hose valve is opened and the outboard end of the hose is allowed to drain to the ship. The pumpout pump empties the inboard end of the hose.

Vessel personnel disconnect and blind off the loading hose while it is still on the vessel and over the vessel’s drip pan. The blind is bolted and the TPIC confirms that the gasket is in place. The TPIC confirms that all Shell valves and tanks are closed. The loading hoses are returned to stored positions on the dock and secured.

Final paperwork and copies of the Declaration of Inspection are completed. The radio is retrieved from the vessel and the vessel can be unmoored. Final duties of the TPIC include washdown of the dock area, checking to assure that the sump is properly pumped out, putting away tools, taking samples to the sample storage building in the terminal, and delivering completed logs, forms, and paperwork to the main office.

Shell Terminal Inspection Programs

Per Appendix B of the Shell Application, a 1995 agreement between the CSLC MFD and the California State Fire Marshall's (CSFM) Pipeline Safety Division determined agency jurisdiction over the facility's pipelines. The CSLC has jurisdiction over all 14 dock lines (ranging in size from 4-inch to 20-inch) to the first valve inside the border of the Refinery, which is housed in a secondary containment structure referred to as "Lands End" (see Figure 2.3-1). Lines from this point back to tankage are regulated by EPA's Spill Prevention, Control and Countermeasure (SPCC) regulations. The CSFM has jurisdiction over Texaco's incoming 24-inch crude oil pipeline to the first block valve inside the Refinery and Kinder Morgan's outgoing 8-inch and 10-inch pipelines starting at the first block valves inside the Refinery.

Facility inspections are performed by numerous agencies, including, but not limited to, the BAAQMD, the CSLC, the USCG and the CSFM. The BAAQMD has the authority to enforce air quality regulations. The CSLC MFD monitors all portions of transfer operations to ensure compliance with State and Federal regulations, in order to prevent oil spills. The CSLC and the USCG conduct quarterly and annual inspections of documents (spill plans, training, security, etc.), operational practices and overall state of the facility. The CSLC also performs engineering inspections, which typically include structural, mechanical, electrical and other engineering aspects of the marine oil terminal (MOT).

In addition to reliance on agency inspections, Shell self-certifies its own maintenance and inspections of the facility. The Shell Terminal equipment inspection program consists of structural inspections of the Shell Terminal trestle, pipelines, and annual component inspections. Structural and pipeline inspections are routine elements of facility operation. Shell also contracts third party inspections as needed to assure operational safety and facility integrity.

Emergency Shutdown Systems

Emergency switches for shutdown of the Shell loading pumps are located on the Shell Terminal at both berths, at the Center Office, and at the MVR. Automatic isolation valves are triggered to stop flow by activating the emergency switches. These remotely-operated valves are capable of providing 100 percent closure in less than 60 seconds. The emergency shutdown systems also are capable of triggering automatic isolation valves located in the Refinery where the product is drawn from tankage. Either Shell Terminal or vessel personnel can initiate emergency shutdown.

In addition to the automatic shutdown systems, manually operated isolation valves for all transfer lines are located onshore at the end of the Shell Terminal approach.

Check valves located on the Shell Terminal stop the flow of oil from the Shell facility into the water if a ship breaks loose from any loading hose while pumping oil on shore. A lever arm holds the check valves open while pumping oil from Shell to a vessel. This lever can be quickly released if a loading hose breaks loose.

In an emergency, the MVR system can be started, stopped or shutdown by push buttons at the MVR control panel. In addition, the main Shell Terminal emergency shutdown buttons can be used to immediately shut down all transfer operations including the MVR.

Transfer operations are immediately suspended when any of the following conditions occur:

- Breakdown or loss of communication between operator and vessel;
- Oil spillage (on deck or to surrounding water);
- Fire/explosion (on vessels or on Terminal);
- Excessive wind that compromises safe mooring management of vessels;
- Marine incidents, such as collision or impending collision, close passing vessels creating “surge” off the dock, personnel incidents on board that threaten the safe transfer of oil;
- Slack mooring lines;
- Significant earthquake or other natural events that compromise the safe transfer of oil; or
- Vessel drifting off-spot, affecting the safe use and operation of loading hoses.

2.3.4 Volumes and Types of Materials Handled in Recent Years

The maximum amount of throughput that the Refinery is currently permitted to process by the BAAQMD is 163,000 barrels per day (bpd) annual average (59 million barrels [bbl] annually) with a 178,800 bpd maximum average. The BAAQMD permit covers maximum allowable emissions associated with the Refinery, which covers the Shell Terminal as well. Table 2.3-1 shows the throughput for the Shell Terminal, for the years 2000 through 2004 in barrels per year (bpy). Increased foreign crude oil shipments through the Shell Terminal to the Refinery constituted the majority of the increase from 2003 to 2004.

Table 2.3-1
Throughput Summary for the Shell Terminal
(In Barrels Per Year)

Year	Shell Terminal Receipts (Vessel Volumes Arriving)	Shell Terminal Deliveries (Vessel Volumes Departing)	Total Yearly Throughput
2000	5,336,836	7,654,269	12,991,105
2001	6,982,201	8,576,266	15,558,467
2002	6,191,009	8,802,625	14,993,634
2003	8,414,794	8,432,865	16,847,659
2004	13,821,244	10,561,853	24,393,097
Average	*8,151,217*	*8,805,576*	*16,956,671*
Source: Shell Oil Products US, 2005			

The Shell Terminal handles a variety of light and heavy petroleum products as listed below:

Light Products: finished gasoline, gasoline components and blend stocks, jet fuels, diesel fuels, cutter stocks.

Heavy Products: crude oils, gas oils, residual materials, condensates and other Refinery feedstocks.

The level of shipment activity is not expected to change during the proposed lease period. The development of new inland crude sources within California, such as Bakersfield, to replace marine shipments is not expected.

2.3.5 Existing and Anticipated Maximum Vessel Calls at the Shell Terminal over the Proposed Lease Period

Anticipated Shell Terminal use for current operations and in the immediate future range from 17,000,000 bpy (46,575 bpd) (current) to 27,000,000 bpy (73,972 bpd) (anticipated maximum). This corresponds to annual ship and barge traffic of approximately 265 vessels on average (current) to an estimated 260 to 330 vessels (anticipated). This anticipated range is based on increased Shell Terminal use via increased crude oil receipts rather than product deliveries. At this time, Shell does not have any immediate plans to modify the Shell Terminal over the 30-year term of the proposed lease, other than possibly to dredge and use the currently inactive Berths #3 and #4.

Shell records indicate that, during the 1994 to 2004 period, the Shell Terminal handled as many as 420 annual vessel calls at a volume of 48,300,000 bpy (132,328 bpd). The maximum capacity that the Shell Terminal could handle is 50,000,000 bpy (136,986 bpd), with increases expected from crude oil shipments rather than product deliveries. Future deliveries are expected to be via larger crude transport vessels, thus reducing the number of annual vessel calls. Shell estimates that future vessel traffic could reach up to 330 ships and barges per year. This number for vessel calls served the basis for the impact analysis in Section 4.0, Existing Environment and Impacts Analysis, assuming no new Shell Terminal construction.

Records from the Marine Exchange show that most, but not all, traffic calling at the Shell Terminal comes primarily from other terminals in the Bay Area. None of the tankers calling at the Shell Terminal travel to or from terminals further upstream of the Bay/Delta system.

Time of mooring at the Shell Terminal has varied with vessel volume and type of cargo. A ship with a typical cargo of 132,000 bbls docks for approximately 32 to 40 hours, while a barge with a typical cargo of 70,000 bbls docks for approximately 12 to 20 hours.

Typically, tankers calling on the Shell Terminal range from 30,000 Dead Weight Tonnage (DWT) to 70,000 DWT. DWT are the units used to establish the maximum weight of a vessel that can be handled safely. As mentioned in Section 2.3.2, Physical Description of Shell Terminal, the Shell Terminal currently handles vessels with displacements up to 188,000 L/T DWT and up to 1,000 feet in length.

The depth of the water and bridge clearances are limiting factors for the sizes of vessels calling at the Shell facility. The current maximum draft of vessels transiting to the Shell Terminal is restricted by the Pinole Shoals, whose calculated maximum depth is 32.5-feet MLLW, plus or minus the tide height at transiting time, with allowance of at least 2 feet for underkeel clearance. Federal, State and local agencies, as well as shipping interests, continue to consider deepening the Pinole Shoals area.

The maximum vertical clearance (distance from the waterline to the lowest point on the bridge) restriction on Carquinez Bridge (I-80) is 134 feet Mean Higher High Water (MHHW) and 135 feet MHHW for the Benicia-Martinez Bridge. However, ordinary circumstances do not require a tanker to go under the Benicia-Martinez Bridge for turning movements or shipments.

A possible future scenario based on current crude oil production projections in the SJV fields is that the SJV crude currently processed by the Shell facility may be stopped completely in-lieu of non-California crude oil stocks. If so, one possible outcome is that all of the crude processed at the facility would be delivered via the Shell Terminal. Were this to occur, and exceed the maximum capacities, additional environmental permitting would be required through the BAAQMD and the Regional Water Board.

2.3.6 Shipping Routes

Various ships follow established routes from as far south as San Pedro, California, to as far north as the Cook Inlet in the Gulf of Alaska. All products are transported by ship to the northwest United States and British Columbia because no product pipelines exist. This is due to: (1) limited pipeline capacity in the northwest; (2) vessels are currently the dominant transport mode, and (3) most vessels have established, over time, well-worn routes along the Pacific seaboard.

In 1992, the Western States Petroleum Association, in agreement with the CDFG and 10 oil shipping companies, adopted a voluntary agreement to maintain a minimum distance of 50nm offshore the mainland for loaded ANS crude oil tankers transiting between Alaska and California. This distance is maintained except when approaching from offshore into the Main (west) directed traffic area south of the Farallon Islands. This minimum distance does not apply to other crude oil tankers. Product tankers typically follow routes closer to shore at an average distance of approximately 15 to 20 miles.

As shown on Figure 4.1-2, and described in more detail in Section 4.1, Operational Safety/Risk of Accidents, the USCG has established three major vessel traffic lanes for north, south, and west approaches to San Francisco Bay. Each approach consists of a 1-mile-wide inbound lane, a 1-mile-wide outbound lane, and a 1-mile-wide separation zone. Approximately 16 miles west of the Golden Gate, these lanes enter a "Precautionary Area" where traffic is merged with eastbound traffic lanes through the Bar Channel toward San Francisco Bay.

Once inside the Precautionary Area, vessels use the USCG Vessel Traffic Service on Yerba Buena Island. Vessels pass through Regulated Navigational Areas (RNA) on their way through the Bay and Carquinez Strait to the Shell Terminal. Refer to Figure 4.1-3, in Section 4.1, Operational Safety/Risk of Accidents. Vessels calling at the Shell Terminal typically pass through the San Francisco Bay RNA, the North Ship Channel RNA, the San Pablo Strait Channel RNA, the Pinole Shoal Channel RNA before entering Carquinez Strait, and the Southern Pacific Railroad RNA in Carquinez Strait. RNAs organize traffic flow patterns to reduce vessel congestion where maneuvering room is limited; reduce meeting, crossing, and overtaking situations between large vessels in constricted channels; and limit vessel speed. Additional information, including maps of the RNAs, is included in Section 4.1, Operational Safety/ Risk of Accidents.

Vessels transit San Francisco Bay along one of several traffic lanes depending on draft. These include the Deep Water Traffic Lane (DWTL) north of Harding Rock or the westbound/eastbound traffic lanes north/south of Alcatraz.

Many vessels bound for Bay Area terminals offload some cargo at Anchorage No. 9, in the Bay prior to navigating through the channel. Anchorage No. 9, shown in Figure 3.4-1 (Section 3.4, Cumulative Projects), can accommodate large deep draft vessels and is the only anchorage that allows lightering in the Bay due to sensitive resources near other anchorages. Lightering to reduce ship draft typically involves the transfer of petroleum liquids from a large ship to a smaller vessel. While such operations are typically associated with ANS crude deliveries, circumstances that require lightering operations are varied and not necessarily related to specific vessels or cargo. Lightering operations are also conducted using vapor recovery to meet emission limits specified under the BAAQMD Regulation 8, Rule 46, Marine Tank Vessel to Marine Tank Vessel Loading.

Shell Terminal bound vessels typically do not lighter in the Bay due to draft restrictions by the Pinole Shoal (32.5-foot MLLW plus or minus the tide at transiting time to allow at least 2 feet of underkeel clearance). Over the past approximately six years, Shell has had approximately 2 vessels lighter at Anchorage 9. However, during the proposed lease period, Shell Terminal bound vessels may lighter.

The distance from the Golden Gate to the Shell Terminal is 30 miles. Vessels stop to pick up a pilot at the sea buoy, 11 miles outside the Golden Gate. Accordingly, from the Golden Gate to the Shell Terminal, a vessel will make a steady speed of 8 to 12 knots. At an average speed of 10 knots, that would be approximately 3 hours to reach the Shell Terminal.

2.3.7 Oil Spill Response Capability

Shell's Oil Spill Response Plan (Shell 2005) lists the Shell Terminal's oil spill response equipment in Table 2.3-2. The purpose of this equipment is to provide initial containment response to attempt to contain a spill before it spreads to a larger area. Containment boom can be deployed with 30-minutes of confirmation that a spill has occurred.

The Oil Spill Response Plan specifies that the following response equipment and testing procedures must be implemented:

- <u>Containment Boom</u>: During semi-annual boom deployment exercises, boom will be inspected for signs of wear, or structural deficiencies. If tears in fabric or rotting of fabric is observed, boom will be repaired or replaced. In addition, end connectors will be inspected for evidence of corrosion. If severe corrosion is detected, equipment will be repaired or replaced;

- <u>Response Boats</u>: Response boats will be put in the water and engines will be started at least monthly. If any mechanical problems are detected, they will be repaired in a timely manner; and

- <u>Other Equipment</u>: Other response equipment will be inventoried and inspected to ensure that the stated quantities are in inventory and in proper working order. Documentation of equipment inspection and deployment exercises are maintained at the Facility.

Table 2.3-2
Shell Terminal Oil Spill Response Equipment

Type	Quantity	Make/Model	Location	Equipment Design
Spill Boom	2,600 feet.		Shell Terminal	30 minute deployment time
Sorbent Swepps	30 Bundles		Oil Spill Warehouse	15 minute deployment time
Sorbent Pads	30 Bales		Oil Spill Warehouse	10 minute deployment time
Sorbent Pom-Poms	100 Boxes		Oil Spill Warehouse	10 minute deployment time
Boat	1	Boston Whaler	Shell Terminal Boat House	20 feet – 10 minute deployment time
Boat	1	Boston Whaler	Martinez Marina	26 feet – 10 minute deployment time
Boat	2	Aluminum Workboats	Shell Terminal Boat House	20 feet – 10 minute deployment time
Boat	1	Aluminum Workboats	On Trailer at Land's End	20 feet – 10 minute deployment time
Boat	2	Aluminum Workboats	Oil Spill Warehouse	Up to 16 feet – 10 minute deployment time
Source: Shell Martinez Refinery Oil Spill Response Plan 2005.				

Shell has implemented many of the spill prevention measures. Shell contracts for spill response services with the Marine Spill Response Corporation (MSRC), which serves as the primary Oil Spill Response Organization (OSRO) contractor in their Oil Spill Response Plan for onwater, onshore, and shallow water response.

MSRC maintains an extensive inventory of owned response equipment. This equipment is dedicated to spill response, and is stored and maintained at MSRC's 51 equipment pre-position sites across the U.S. MSRC's capabilities are augmented by a network of over 90 participants in the Spill Team Area Responders ("STARs") program, an affiliation of environmental response contractors located throughout the country.

The CDFG, OSPR and the USCG issue the Area Contingency Plan (ACP) that provides guidance on sensitive sites, initial response techniques and response requirements for the type of boom, skimmers, and number of personnel.

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